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# Author's Accepted Manuscript

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## Perinatal anxiety disorder prevalence and incidence

Nichole Fairbrother<sup>1\*</sup>, Patricia Janssen<sup>2</sup>, Martin M Antony<sup>3</sup>, Emma Tucker<sup>4</sup>, Allan H Young<sup>5</sup>

<sup>1</sup>Department of Psychiatry, Island Medical Program, University of British Columbia, Canada

<sup>2</sup>UBC School of Population and Public Health, Canada

<sup>3</sup>Department of Psychology, Ryerson University, Canada

<sup>4</sup>Faculty of Medicine, Island Medical Program, University of British Columbia, Canada

<sup>5</sup>Institute of Psychiatry, Psychology and Neurosciences, King's College London, UK

\* **Corresponding author:** Nichole Fairbrother, Queen Alexandra Centre for Children's Health, 2400 Arbutus Rd, Victoria B.C. V8N 1V7. Phone number: (250) 886-4365. Email: nicholef@uvic.ca.

**Abstract****Background:**

Anxiety and related disorders (AD) disproportionately affect women, and are the most prevalent of all mental health conditions. The current research represents the first study of maternal *postpartum* AD prevalence in which all of the AD are assessed, and one of few studies of this type in which maternal *prenatal* AD incidence is assessed.

**Methods:**

A Canadian sample of pregnant women (N = 310) was recruited from a defined geographical area between November 2007 and November 2010. Participants were first administered postnatal mood and anxiety screening measures. Those who scored at or above cutoff on one or more of these measures were administered a diagnostic interview for depression and anxiety at approximately three months postpartum (n = 115). Findings from the diagnostic interview were used to estimate the prevalence and incidence of mood and AD in pregnancy, as well as at and during the first three months postpartum. Period prevalence and incidence estimates were obtained retrospectively from interview data collected postnatally.

**Results:**

The prevalence of AD during pregnancy and the early postpartum period (15.8% and 17.1% respectively) exceeded that of depression (3.9% and 4.8% respectively). The prevalence of OCD in

our sample exceeded that of OCD among adults aged 18-64. Parity was unrelated to AD prevalence. Slightly less than 5% of participants were comorbid for both AD, and depression.

**Limitations:**

This study is limited by a relatively small sample size for a prevalence study, and non-random sample selection. As only women who scored above cutoff on one or more screening measures were interviewed, prevalence estimates are conservative. Finally, prenatal prevalence estimates are based on retrospective report provided postpartum.

**Conclusions:**

This study provides evidence that, as a group, anxiety and related conditions affect a significant proportion of postpartum women, and are more prevalent than is postpartum depression.

**Key words.**

Anxiety/anxiety disorders, epidemiology, pregnancy and postpartum, depression, OCD/obsessive compulsive disorder.

**Introduction**

Anxiety and their related disorders (AD; i.e., anxiety disorders, obsessive compulsive disorder, posttraumatic stress disorder) are the most prevalent of all psychiatric conditions (Kessler et al., 2005a), yet in contrast with the ongoing research and health service focus on postpartum depression, perinatal AD have received surprisingly little attention (Manassis, Bradley, Goldberg, Hood, & Swinson, 1995). Nearly one-third (28.8%) of the adult population will suffer from an AD at some time in their life (Kessler et al., 2005a). This is considerably greater than the prevalence of mood disorders (20.8%), impulse-control disorders (24.8%) and substance use disorders (14.6%) (Kessler et al., 2005a; Manassis et al., 1995). Further, women are approximately 1.5 times more likely to suffer from an AD than are men<sup>1</sup>. The AD frequently result in significant impairment, and

are associated with a high level of health care service utilization and indirect health costs (Ahmad, Suleiman, & Shougah, 1994; Sutter-dallay, Giaconne-marcesche, Glatigny-dallay, & Verdoux, 2004). Determining the scope of AD during the perinatal period is critical for well-informed planning with respect to prevention, treatment and resource allocation for this group of women and their infants. The perinatal AD literature suggests a prenatal prevalence of 9% to 22%, a postpartum prevalence of 11% to 21%, and a postpartum incidence of 2.2% to 8.8% (prenatal incidence data are not available) (Borri et al., 2008; Giardinelli et al., 2012; Mota, Cox, Enns, Calhoun, & Sareen, 2008; Reck et al., 2008; Uguz, 2010; Wenzel, Haugen, Jackson, & Brendle, 2005; Wynter, Rowe, & Fisher, 2013). However, we are aware of no published reports of *postpartum* AD prevalence/incidence that include all of the following criteria: (a) an assessment of all of the principal AD, (b) the use of samples that are either representative or unselected, and (c) the administration of assessments based on gold standard methods (i.e., diagnostic interviewing). Further, to our knowledge, only two published studies report the prevalence of *prenatal* AD, and meet the above criteria (Giardinelli et al., 2012; Reck et al., 2008). Consequently, published reports may not accurately estimate the actual prevalence and incidence of perinatal AD.

### **Aims of the Study**

The primary objective of this research is to document the prevalence and incidence of maternal AD in the first three months postpartum. Secondary objectives are to: (a) estimate the prevalence/incidence of maternal AD in pregnancy, (b) compare the prevalence of depression to the prevalence of AD in pregnancy and the first three months postpartum, (c) estimate the prevalence of the specific AD in pregnancy and the first three months postpartum, (d) compare the prevalence and incidence of the AD in pregnancy and the first three months postpartum, among nulliparous and multiparous women, (e) estimate the prevalence and incidence of OCD in pregnancy and the first three months postpartum, and (f) estimate the level of comorbidity of depression and AD in

pregnancy and the first three months postpartum.

## **Materials and Methods**

Full study methods have been published in *BMC Psychiatry* (Fairbrother, Young, Janssen, Antony, & Tucker, 2015). Consequently, only those study methods relevant to the current publication are presented here.

### **Study Design**

We conducted a study of maternal perinatal AD prevalence and incidence.

### **Inclusion/Exclusion Criteria**

Prospective participants were eligible to participate if they lived in the City of Vancouver, British Columbia, Canada (selected geographical boundary of the research) at the time of recruitment, were pregnant and spoke English fluently. The target population for the research are all English-speaking pregnant women living in the City of Vancouver, British Columbia during the recruitment time frame. The City of Vancouver is a precisely-defined geographical region.

### **Recruitment**

Pregnant women were recruited via prenatal clinic visits, physician offices and midwifery clinics at British Columbia (BC) Women's Hospital, St Paul's Hospital and Burnaby Hospital, through community outreach at events and through word of mouth. The primary method of recruitment was direct-approach (i.e. approaching women as they wait for their appointments). The remainder were recruited through the use of posters and pamphlets. Recruitment took place between November 9, 2007 and November 12, 2010.

### **Ethics**

Ethical approval for the research was granted by the University of British Columbia / Children's and Women's Health Centre of British Columbia Research Ethics Board (UBC C&W REB; CW07-0085/H07-00048). All participants completed the study consent form.

## Participants

Three hundred and forty-seven women participated in the research. Of the 347 women who participated, 152 were eligible for interview based on their questionnaire responses (see procedures below). Of the 152 potential interview participants, 115 were interviewed. The remaining 37 were not interviewed because they declined the interview ( $n = 7$ ), were unresponsive to our attempts to schedule an interview ( $n = 9$ ), or were not invited due to administrative error ( $n = 21$ ). The final sample comprised 310 participants.

## Sample Size Justification

A sample size of  $N = 300$  allows us to estimate the period prevalence of perinatal AD from birth to three months postpartum with an accuracy of  $\pm 4\%$  (using a 95% confidence interval, and assuming an observed period prevalence of 15%). Assuming a prevalence of depression of 7.1% in the first 3-months postpartum (Gavin et al., 2005), the difference in period prevalence between depression and AD would be statistically significant with  $N = 300$ .

## Representativeness

Based on 2003/2004 statistics, approximately 6000 babies are born to Vancouver residents each year (British Columbia Perinatal Database Registry, 2005). Of these, 98% of births by Vancouver residents take place at BC Women's Hospital (73%), St Paul's Hospital (19%), Burnaby Hospital (4%), or at home (2%). To improve the likelihood of obtaining a representative sample, women were recruited proportionally from each site.

## Procedures

### Screening.

Women who consented to participate were asked to complete a set of screening questionnaires for mood and anxiety (see below), at six to eight weeks postpartum. Those who scored at or above predetermined cutoffs on any of the screening measures were invited to

participate in a diagnostic interview; women who scored below cutoff on all screening measures were not interviewed.

### **Interviews.**

A total of 115 women were interviewed. Interviews were conducted at approximately three months postpartum. Women were offered the choice of coming to BC Women's Hospital for their interview, or having the interview conducted in their home. The majority (> 90%) elected to have the interview conducted in their home. At the time of the diagnostic assessment, women who reported symptoms meeting criteria for any mood or AD were provided with appropriate mental health referrals.

### **Assessment Tools**

#### **Demographic and reproductive measures.**

In the initial questionnaire package demographic questions included age, income, education and marital status, as well as reproductive information (e.g., parity). Questions included a mixture of multiple choice and open-ended questions.

#### **Self-report measures.**

At six to eight weeks postpartum ( $M = 7.0$ ,  $SD = 3.6$ ) women completed the following screening tools used to assess for symptoms of all of the AD and for depression. Scores from these measures were used to determine interview eligibility. Measures were selected for their psychometric properties and because they possess good sensitivity and specificity (Beck, Epstein, Brown, & Steer, 1988; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Connor et al., 2000; Cooper & Murray, 1998; Cox, Holden, & Sagovsky, 1987; Eberhard-Gran, Eskild, Tambs, Opjordsmoen, & Samuelsen, 2001; Foa et al., 2002; Kleinknecht & Thorndike, 1990; Klorman, Weerts, Hastings, Melamed, & Lang, 1974; Meyer, Miller, Metzger R.L., Borkovec, 1990; Molina & Borkovec, 1994; The PTSD Checklist, 1993). All screening tool, with the exception of the



Specific Phobia Questionnaire (see below), have been validated in settings similar to our own (Chambless, et al., 2011; Connor et al., 2000; Eberhard-gran et al., 2001; Evans, Spiby, & Morrell, 2015; Foa et al., 2002; McDonald & Calhoun, 2010; Newman, Holmes, Zuellig, Kachin, & Behar, 2006; Simpson, Glazer M, Michalski, Steiner, & Frey, 2014; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002). For most of the anxiety disorders, screening instruments which have been validated for use in perinatal populations do not exist. The exceptions to this are the Generalized Anxiety Disorder 7-Item Scale and the Edinburgh Postnatal Depression Scale described below.

***Generalized Anxiety Disorder 7-Item Scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006).***

The GAD-7 is a seven item self-report measure designed to assess for generalized anxiety disorder (GAD) (Spitzer, et al., & Löwe, 2006). Items are rated on a zero to three, Likert-type scale. The GAD-7 has been found to demonstrate good reliability as well as convergent, criterion, construct, factorial and procedural validity (Kertz, Bigda-peyton, & Bjorgvinsson, 2013; Spitzer et al., 2006). The GAD-7 is sensitive to change over time (Kertz et al., 2013). The GAD-7 has been validated for use in the perinatal period (Simpson et al., 2014). Prior research has found a Cronbach's alpha of 0.92 (Spitzer et al., 2006). The Cronbach's alpha in this study was 0.90. A cut point of 10 was used as it has been found to optimize sensitivity and specificity at 89% and 82%, respectively (Spitzer et al., 2006).

***The Obsessive Compulsive Inventory – Revised (OCI-R; Foa et al., 2002).***

The OCI-R is an 18-item self-report measure of OCD. Items are scored on a five-point, Likert-type scale. The psychometric properties of the OCI-R are excellent (Abramowitz & Deacon, 2006; Abramowitz, Tolin, & Diefenbach, 2005; Foa et al., 2002; Hajcak, Huppert, Simons, & Foa, 2004). In previous research, a Cronbach's alpha of 0.90 has been found for the total scale, and 0.88

for the obsessing subscale (Foa et al., 2002). In the current study, we found a Cronbach alpha of 0.90 for the total scale and 0.84 for the obsessing subscale. When used to screen for OCD, the Obsessing subscale shows higher levels of sensitivity and specificity compared with the full OCI-R (i.e., 74% and 76% versus 66% and 63%) (Foa et al., 2002). Consequently, we used the OCI-R Obsessing subscale, with a cutoff score of four (sensitivity = 74%, specificity = 76%), as our measure of obsessive compulsive symptoms.

***Mini Social Phobia Inventory (Connor, Kobak, Churchill, Katzelnick, & Davidson, 2001).***

The Mini-SPIN is a brief, three-item measure derived from the full scale *Social Phobia Inventory* (Connor et al., 2000), and has been found to demonstrate strong internal consistency reliability, as well as convergent and discriminant validity (Weeks, Spokas, & Heimberg, 2007). Items are scored on a zero to five, Likert-type scale. Prior research has found a Cronbach's alpha of 0.94 (Connor et al., 2000). In the current study, the Cronbach's alpha was 0.94. A cut score of six on the Mini-SPIN has been found to represent good sensitivity (89% and 94%) and specificity (90% and 64%) (Connor et al., 2001; Weeks et al., 2007).

***Panic Disorder Self-Report (Newman et al., 2006).***

The PDSR is hierarchical questionnaire, modeled following the panic disorder module of the *Anxiety Disorders Interview Schedule* (ADIS-IV; Brown, Di nardo, Lehman, & Campbell, 2001). The PDSR begins with questions key to a diagnosis of panic disorder. Only if these initial questions are answered in the affirmative, are the remaining questions administered. A score of 8.75 has been found to optimize sensitivity (89%) and specificity (100%) and was therefore selected for this research (Newman et al., 2006). The PDSR has been found to have excellent test-retest reliability, and convergent and discriminant validity (Newman et al., 2006).

***Mobility Inventory for Agoraphobia (MI; Chambless, 1985).***

The MI is a 27-item, self-report inventory of avoidance behaviours and panic attacks in agoraphobia. Items are scored on a one (rarely avoids) to five (always avoids) Likert-type scale, and assess agoraphobic avoidance when the person is alone and when accompanied. Test-retest reliability ranges from .75 to .90 (Rodriguez, Pagano, & Keller, 2007). In prior research, the Cronbach alpha for avoidance accompanied has been 0.95 (0.95 in the current study also), and for avoidance alone 0.96 (0.95 in the current study) (Chambless, 1985). A cutoff of 1.5 or greater based on the mean of the alone and the accompanied scores was used, and represents a sensitivity of 78% and specificity between 76% and 85%. When using the avoidance alone scale only, sensitivity is high (91%), but specificity is low (67%) (Chambless et al., 2011).

***Specific Phobia Questionnaire (Fairbrother & Antony; 2011).***

The SPQ is a 43-item, self-report measure of specific phobias, assessing 43 different fears (e.g. dogs, elevators, driving). The SPQ provides both a fear and an interference rating for each fear item. Fear and interference items are scored on a zero (none) to four (extreme) Likert-type scale. Although not yet published, the measure has been administered to a clinical sample ( $N > 700$ ), and to a student sample of approximately 200. Psychometric analysis of the full SPQ is currently underway. The only published report of the SPQ to date pertains to the fear of dogs item (Vorstenbosch, Antony, Koerner, & Boivin, 2012). The SPQ fear of dogs item has been found to correlate well with the Dog Phobia Questionnaire ( $r = 0.73$  for fear and 0.60 for interference) (Vorstenbosch et al., 2012). In the current study we found Cronbach alphas of 0.93 for fear items, and 0.95 for avoidance items. We used a cutoff score of six or greater (combined fear and interference ratings) on one or more SPQ items.

***PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993).***

The PCL is 17-item self-report measure to assess symptoms of posttraumatic stress disorder (PTSD). Items are rated on a one (not at all) to five (extremely) Likert-type scale. The PCL has been

found to have good internal consistency, test-retest reliability and convergent validity (Wilkins, Lang, & Norman, 2011). The Cronbach alpha for the PCL has been reported at 0.94 (Blanchard et al., 1996). In the present study we found a Cronbach alpha of 0.92. We used a cutoff score of 44 to maximize sensitivity at 94% and specificity at 86%. A cutoff score of 50 only provides a sensitivity of 78% and a specificity of 86% (Blanchard et al., 1996).

***Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987).***

The EPDS is a 10-item self-report measure screening tool for postnatal depression. The sensitivity and specificity of the EPDS are in acceptable ranges (65% - 100% and 49% - 100%, respectively) (Eberhard-gran et al., 2001). In previous research the Cronbach alpha for the EPDS has been reported at 0.87 (Cox et al., 1987). In this study, we found a Cronbach alpha of 0.87, and used a cut score of 9.5. With one exception (sensitivity = 0.65), the sensitivity of the EPDS at a cut-score of 9.5 ranges from 0.90 to 1.0. among nine studies (Eberhard-gran et al., 2001). Higher sensitivity relative to specificity is appropriate for a screening instrument. The EPDS is the most widely used screening tool for postpartum depression (Jomeen & Martin, 2005).

**Diagnostic instrument.**

The Structured Clinical Interview for DSM-IV (SCID-IV) (First, Spitzer, Gibbon, & Williams, 1996) is a reliable and valid semi-structured diagnostic interview designed for the assessment of a wide range of psychiatric problems. The SCID was used to assess depression and the eight primary AD: panic disorder, agoraphobia, social anxiety disorder, specific phobias, acute stress disorder, posttraumatic stress disorder, obsessive compulsive disorder, and generalized anxiety disorder. The 6-month duration criterion for generalized anxiety disorder was waived for the purposes of the current study.

Diagnostic assessments took place, on average, at 13-weeks postpartum ( $M = 13.0$ ,  $SD = 5.3$ ), but encompassed the time period from the beginning of the current pregnancy through to the

diagnostic assessment (i.e., approximately 13-weeks postpartum), thus providing information about prevalence/incidence in pregnancy and in the postpartum.

Interviews were conducted by PhD students in clinical and counselling psychology degree programs. Interviewers were all trained to a strict criterion. Specifically, interviewers were required to meet the following criteria in order to be considered ready to interview independently. First, they were required to match the principal investigator (PI) on the principal diagnosis, on three successive interviews. Second, they were required, on those three interviews to rate the severity of the principal diagnosis to within one severity point on either side (higher or lower), of the principal investigator's severity rating. Subsequently, interviewers were supervised by the project PI. Interviews lasted approximately one hour in length. Most interviews were recorded to allow for review in cases of diagnostic uncertainty, with call-backs made to participants if further clarification was needed.

## **Data Analysis**

### **Prevalence and incidence definitions for the current study.**

**Time frame.** The time frames for assessing prevalence and incidence estimates were:

1. *Pregnancy*: From the beginning of pregnancy to birth.
2. *Postpartum*: from birth to the time of the postnatal interview.
3. *Perinatal*: from the beginning of the current pregnancy to the time of the postnatal interview. Prevalence and incidence were defined as follows:

**Prevalence.** Prevalence, for the purpose of this study, is defined as follows:

1. AD prevalence was defined as the proportion of women who met full diagnostic criteria for one or more AD during one of the identified time frames (see above).
2. Depression prevalence was defined as the proportion of women who met full diagnostic criteria for depression during one of the identified time periods (see above).

**Incidence.** Incidence, for the purpose of this study, is defined as follows:

1. AD incidence was defined as the proportion of women in the sample who experienced one or more AD beginning during one of the identified time frames (see above).
2. Depression incidence was defined as the proportion of women in the sample who experienced a new episode of depression beginning during one of the identified time frames (see above).

**Individual AD.** The prevalence and incidence of the individual AD follow the definition provided for depression.

#### **Primary objectives.**

1. *Postpartum prevalence/incidence of maternal AD:* Estimates for the prevalence and incidence of maternal anxiety disorders in the first three months postpartum are provided along with their 95% confidence intervals.

#### **Secondary objectives.**

1. *Pregnancy prevalence/incidence of maternal AD:* Estimates for the prevalence and incidence of maternal AD in pregnancy are provided along with their 95% confidence intervals.
2. *Prevalence/incidence for maternal depression:* For comparison purposes, we also provide 95% confidence intervals for the prevalence and incidence of depression in pregnancy and the first three months postpartum, based on findings from the diagnostic interviews. We compare our prevalence data for perinatal depression with standard rates for this disorder<sup>45</sup>.
3. *Individual AD prevalence:* Estimates for the prevalence of the specific AD in pregnancy and the first three months postpartum are provided along with their 95% confidence intervals.
4. *Parity:* Estimates of the prevalence of AD in pregnancy and the first three months postpartum, among primiparous compared with multiparous women, are provided along with their 95% confidence intervals.
5. *Obsessive-compulsive disorder (OCD):* Estimates of the prevalence and incidence of OCD in

pregnancy and the first three months postpartum, along with 95% confidence intervals for these estimates, are compared with population-based estimates of the one-year prevalence rate of OCD among adult women in the general population.

6. *Comorbidity*: Information about the level of comorbidity of depression and AD in pregnancy and in the first three months postpartum were obtained from the diagnostic interview and presented descriptively with 95% confidence intervals.

## Results

### Participants

On average, women were 33.9 years old ( $SD = 6.3$ ), and 27.6 weeks pregnant ( $SD = 8.6$ ) at the time of enrollment. The vast majority were married (80.5%) or living with a romantic partner (14.1%). The remainder were single (3.4%), divorced (0.3%) or separated (0.7%). The majority of participants are Caucasian (71.8%) or Asian (19.2%). The remainder are First Nations Canadians, Hispanic, or Middle Eastern (3.4%) or did not provide data regarding race/ethnicity (5.6%). Participants were well educated, with, on average, over five years of post-secondary education ( $M = 5.4$ ,  $SD = 3.0$ ). Three quarters of the sample reported a family income of \$60,000.00 or more. Over half of all participants (65.8%) were expecting their first child. Most were singleton pregnancies (95.3%) and several were twin pregnancies (4.7%). The majority (90.9%) were recruited via direct-approach recruitment. Fewer than 30 were recruited passively.

Women who were eligible for interview, and who were interviewed ( $n = 115$ ), compared with the women who were eligible for interview, but who were not interviewed ( $n = 37$ ), differed with respect to age ( $M = 33.3$  and  $30.3$  respectively,  $p < 0.01$ ) and family income ( $M = \$75,000$  and  $\$61,000$ , respectively,  $p = 0.03$ ), but not with respect to marital status, education or racial background.

### Prevalence and Incidence

Table 1 presents the  $n$  and percentages for AD and depression prevalence and incidence in pregnancy, the postpartum (i.e., the first three months postpartum), and the full perinatal period (i.e., from the beginning of pregnancy until three months postpartum).

The prevalence of women in our sample who reported symptoms meeting criteria for an AD was significantly greater than the prevalence of women in our sample who reported symptoms meeting criteria for depression, both in pregnancy (95% CI for the OR =  $[4.1 < 13.3 < 43.1]$ ) and in the postpartum (95% CI for the OR =  $[3.4 < 8.6 < 21.7]$ ). However, depression and AD incidence rates did not differ significantly (i.e., all three groups of 95% confidence intervals are overlapping).

Table 2 presents the  $n$  and percentages and corresponding 95% confidence intervals for the prevalence of the individual AD in pregnancy and the postpartum. Other than for OCD, incidences ranged from “0” to “0.9” and are not included in Table 2, as they are too low to be meaningful.

OCD onset occurred in pregnancy (the current pregnancy or a prior pregnancy) among 1.0% of participants (95% CI:  $0.1 < 1.0 < 2.1$ ) and in the postpartum (current or previous) among 2.9% of participants (95% CI:  $1.0 < 2.9 < 4.8$ ). The difference between pregnancy onset and postpartum onset was not statistically significant.

### **Parity**

Table 3 presents the  $N$  and percentages and corresponding 95% confidence intervals for the prevalence and incidence of AD among primiparous and multiparous women, in pregnancy and the postpartum. Although primiparous and multiparous women differ in their likelihood of reporting symptoms meeting criteria for AD in pregnancy and/or the postpartum, differences were non-significant.

### **Comorbidity**

In total 13 (4.2%) participants reported symptoms meeting criteria for both an episode of major depression and an AD at some point in either pregnancy or the first three months postpartum.



Of these, seven (2.3%) met criteria for an AD and depression in both pregnancy and the first three months postpartum, two (0.7%) in pregnancy only and four (1.3%) in the postpartum only.

### Discussion

This is the first published report of both the prevalence and incidence of maternal postpartum AD in which a representative sample was studied, and all of the principal AD were assessed using gold standard assessment methods (i.e., diagnostic interviews). The results of this study echo those of other reports of maternal, perinatal AD prevalence and incidence: namely that maternal perinatal AD affect between 9% and 22% of pregnant and postpartum women, a proportion greater than the prevalence of postpartum depression.

In this study, AD were significantly more common than depression, both in pregnancy and the postpartum (see Table 3). The prevalence of major depression in our sample was slightly lower (6.5%) than that identified in the literature for pregnant and postpartum women (7.1%)<sup>45</sup>. In this research interviewers were trained to carefully distinguish between symptoms representing a normal aspect of pregnancy and the early postpartum (e.g., sleep disturbance, fatigue) and bona fide psychiatric symptoms. For example, sleep difficulties were only coded as part of depression when they extended beyond necessary disruptions to attend to one's infant. This careful ruling out of non-psychiatric symptoms of depression may explain the somewhat lower proportion of women in our sample whose symptoms met criteria for depression. The value of this finding is in highlighting that, relative to how common AD are among pregnant and postpartum women (i.e., significantly more common than is depression), they can be considered to be neglected both clinically and scientifically.

Regarding our prevalence estimates for the individual AD, with two notable exceptions (OCD and PTSD), ours are consistent with those reported in the literature for AD among adults in the general population aged 18-64 years (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen,

2012). Specifically, the proportion of women in our sample who reported symptoms meeting criteria for PTSD was very low compared to the one-year prevalence of PTSD in the general population (i.e. 0.7% versus 3.5%). This is surprising given that (a), given that we would have anticipated a higher prevalence of birth-related PTSD, and (b) women are more than twice as likely as men to develop PTSD (i.e., the one year prevalence of PTSD among women is greater than 7.0%). Of the women in our sample with symptoms meeting PTSD criteria during the perinatal period, none reported that their PTSD was due to either the current birth experience or a previous birth experience. It is unlikely that our cutoff on the PCL was too high given that we selected a cut score that has been found to maximize sensitivity at 94% (Blanchard et al., 1996). A more probable explanation is that women with clinically significant PTSD may have either failed to enroll in the research, or dropped out postnatally as a result of their PTSD symptoms. Further, given that we would anticipate a prevalence of PTSD at approximately 5% (Kessler et al., 2012), it is possible that a sample size of 310 was insufficient to produce a reliable estimate of PTSD prevalence.

The one-year prevalence of OCD among adult women has been estimated at 1.6% (Ruscio, Stein, Chiu, & Kessler, 2010), whereas, in this study, we found a prevalence of 3.9 across the perinatal period (i.e., 12-months; from the beginning of pregnancy to three months postpartum). Our prevalence estimates are consistent with those of a recent meta-analysis comparing the prevalence of OCD in pregnancy and the postpartum to those of female controls in which the prevalence of OCD among pregnant women was estimated at 2.1%, and among postpartum women at 2.4% (Russell, Fawcett, & Mazmanian, 2013). Our data provides further support for the notion that the perinatal period, in particular the postpartum period, is a time of increased risk for the onset and exacerbation of OCD. Larger sample sizes are needed to provide stable and valid estimates of OCD prevalence/incidence in pregnancy and the postpartum. The lead author is currently undertaking such an investigation.

## Implications

Our findings indicate that AD are common among pregnant and postpartum women, significantly more common than is depression. Potentially useful responses to this knowledge include: (a) improved education for pregnant women, their partners and care-providers regarding AD, (b) the addition of anxiety-specific screening to existing screening for depression, and (d) improved access to psychosocial treatments for anxiety. To date, perinatal AD have been, compared with depression, neglected. Increased research and clinical attention to these conditions is warranted.

## Limitations and Future Directions

This study is limited by a relatively small sample size for a prevalence study. Although powered to determine the overall prevalence of perinatal AD among pregnant and postpartum women, it is not powered to provide precise estimates of the prevalence or incidence of individual disorders. Future research may be able to pool findings from multiple prevalence/incidence studies in order to better ascertain the prevalence/incidence of specific anxiety and related conditions among perinatal women.

Although significant effort was made to recruit a representative sample of pregnant women to the study (i.e. recruitment within a well-defined geographical region, and proportional recruitment by intended location of birth), ours was nevertheless not a random sample. Data weighting was limited to location of birth only, we were unable to collect refusal rate data and some differences in demographic characteristics between women who were interviewed and those who were eligible but not interviewed existed. The only realistic way to overcome this obstacle is to collaborate with research units collecting large-scale random samples (e.g.  $N \geq 10,000$ ) such as future iterations of the National Comorbidity Survey (Kessler et al., 2012; Kessler, Chiu, Demler, Merikangas, & Walters, 2005b). For the following reasons, we estimate that selection bias did not significantly impact the study. First, the majority of our study participants were recruited via direct-approach

(91%), thereby minimizing the number of participants who were self-selected to the study. . In order to minimize biased recruitment, we recruited: (a) on various days of the week, and at various times of the day, (b) via both low and high risk obstetrical clinics, and (c) via Midwifery clinics in order to ensure a sample of women who had a planned home birth. Finally, we also used passive recruitment strategies to ensure as broad and representative a sample of women as possible. It may be that women who sought out the study via our passive approaches (e.g., community posters) are less likely to suffer from a mental health condition. Given that there were a total of 28 passive recruits (i.e., 8%) we do not believe this had a significant impact on our findings.

The current study likely provides a conservative estimate of the prevalence/incidence of perinatal AD. This is due to the fact that only women who scored above the cutoff on one or more of the four to six-week postpartum screening measures were subsequently invited to participate in the diagnostic interview. It is unlikely, based on this methodology, that any disorder was over-diagnosed. However, it is possible that a small proportion of all AD were not diagnosed because the participant failed to screen above cutoff on the screening tools. In selecting cut-scores for the screening measures, sensitivity was valued over specificity. A total of eight measures of mood and anxiety symptoms were administered, with scoring above cutoff on any individual measure sufficient to lead to inclusion in the interview group. Given this, it is likely that any participant with symptoms meeting criteria for one or more mood or anxiety and related disorders would have scored above cutoff on at least one of the screening measures. Therefore, although using a two-step process (i.e., screening and then interviewing on the basis of the screening results) creates the potential to under-estimate the likelihood of an anxiety and related disorder or a mood disorder we doubt that, in reality, many cases were missed. Future prevalence/incidence research would benefit from (a) endeavouring to administer diagnostic interviews to the full sample, or conversely (b) administering the diagnostic interview to a random sample of participants who score below cutoff on all screening

measures in order to control for the possibility of false positives.

Finally, prevalence/incidence estimates in pregnancy are based on retrospective reports by participants, provided at the time of the postpartum interview. Consequently, our pregnancy prevalence/incidence estimates are less reliable than those in the postpartum. In order to determine if the probability of onset or exacerbation of any of the AD is elevated in pregnancy (there is reason to believe that this is likely in the case of obsessive compulsive disorder), a prospective design in which participants are interviewed both in pregnancy and again in the postpartum is needed (Wenzel et al., 2005; Uguz et al., 2007; Zambaldi et al., 2009). Further, although each interviewer was carefully trained and closely supervised, an assessment of the reliability of the diagnostic interviews would have been an asset.

#### References

- Abramowitz J.S., Deacon B.J., 2006. Psychometric properties and construct validity of the Obsessive–Compulsive Inventory—Revised: Replication and extension with a clinical sample. *J Anxiety Disord.* 20(8), 1016-1035.
- Abramowitz J.S., Tolin D.F., Diefenbach G.J., 2005. Measuring Change in OCD: Sensitivity of the Obsessive-Compulsive Inventory-Revised. *J Psychopathol Behav.* 27(4), 317-324.
- Ahmad T.F.E., Suleiman R., Shougah D., 1994. Mixed anxiety depression in pregnancy: (The influence of misconceptions). *Arab Journal of Psychiatry.* 5(2), 103-113.
- Beck A.T., Epstein N., Brown G., Steer R.A., 1988. An Inventory for Measuring Clinical Anxiety: Psychometric Properties. *J Consult Clin Psychol.* 56(6), 893-897.
- Blanchard E.B., Jones-alexander J., Buckley T.C., Forneris C.A., 1996. Psychometric properties of the PTSD Checklist (PCL). *Behav Res Ther.* 34(8), 669-673.

- Borri, C., Mauri, M., Oppo, A., et al., (2008). Axis I psychopathology and functional impairment at the third month of pregnancy: Results from the Perinatal Depression-Research and Screening Unit (PND-ReScU) study. *J Clin Psychiat*, 69, 1617-1624.
- British Columbia Perinatal Database Registry, 2005. British Columbia Reproductive Care Program - April 1, 2003 to March 31, 2004: British Columbia deliveries by maternal residence and delivery hospital highest level of service/care. Available at:  
<http://www.perinatalservicesbc.ca/NR/rdonlyres/5496D280-B630-4390-86AB-DE0EC09E5282/0/SurveillanceTableMaternalResidence20032004.pdf>.
- Brown T.A., Di nardo P.A., Lehman C.L., Campbell L.A., 2001. Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *J Abnorm Psychol*. 110(1), 49-58.
- Chambless D.L., 1985. The Mobility Inventory for Agoraphobia. *Behav Res Ther*. 23(1), 35-44.
- Chambless D.L., Sharpless B.A., Rodriguez D., McCarthy K.S., Milrod B.L., Khalsa S., et al., 2011. Psychometric properties of the Mobility Inventory for Agoraphobia: Convergent, discriminant, and criterion-related validity. *Behavior Therapy*. 42(4), 689-699.
- Connor K.M., Davidson J.R.T., Churchill L.E., Sherwood A., Foa E., Weisler R.H., 2000. Psychometric properties of the Social Phobia Inventory (SPIN): New self-rating scale. *Br J Psychiatry*. 176, 379-386.
- Connor K.M., Kobak K.A., Churchill L.E., Katelnick D., Davidson J.R.T., 2001. Mini-SPIN: A brief screening assessment for generalized social anxiety disorder. *Depress Anxiety*. 14(2), 137-140.
- Cooper P.J., Murray L., 1998. Postnatal depression. *BMJ*. 316, 1884.

- Cox J.L., Holden J.M., Sagovsky R., 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry*. 150, 782-786.
- Eberhard-gran M., Eskild A., Tambs K., Opjordsmoen S., Samuelsen S.O., 2001. Review of validation studies of the Edinburgh Postnatal Depression Scale. *Acta Psychiatr Scand*. 104(4), 243-249.
- Evans K., Spiby H., & Morrell C. J., 2015. A psychometric systematic review of self-report instruments to identify anxiety in pregnancy. *J Adv Nurs*. 71(9), 1986-2001.
- Fairbrother N., Antony M. (2011). *Specific Phobia Questionnaire*. Unpublished scale. Department of Psychiatry, University of British Columbia, Victoria, BC, Canada.
- Fairbrother N., Young A.H., Janssen P., Antony M.M., Tucker E., 2015. Depression and anxiety during the perinatal period. *BMC Psychiatry*. 15, 206.
- First M.B., Spitzer R.L., Gibbon M., Williams J.B.W., 1996. Structured clinical interview for Axis I DSM-IV disorders research version.
- Foa E.B., Huppert J.D., Leiberg S., Langner R., Kichic R., Hajcak G., et al., 2002. The Obsessive-Compulsive Inventory: Development and validation of a short version. *Psychol Assess*. 14(4), 485-495.
- Gavin N.I., Gaynes B.N., Lohr K.N., Meltzer-Brody S., Gartlehner G., Swinson T., 2005. Perinatal depression: a systematic review of prevalence and incidence. *Obstet Gynecol*. 106(5).
- Giardinelli L., Castellini G., Faravelli C., Innocenti A., Benni L., Stefanini M.C., et al., 2012. Depression and anxiety in perinatal period: prevalence and risk factors in an Italian sample. *Arch Womens Ment Health*. 15(1), 21-30.
- Hajcak G., Huppert J.D., Simons R.F., Foa E.B., 2004. Psychometric properties of the OCI-R in a college sample. *Behav Res Ther*. 42(1), 115-123.

- Jomeen J., Martin C.R., 2005. Confirmation of an occluded anxiety component within the Edinburgh Postnatal Depression Scale (EPDS) during early pregnancy. *J Reprod Inf Psych.* 23(2), 143-154.
- Kertz S., Bigda-peyton J., Bjorgvinsson T., 2013. Validity of the Generalized Anxiety Disorder-7 Scale in an acute psychiatric sample. *Clin Psychol Psychot.* 20(5), 456-464.
- Kessler R.C., Berglund P., Demler O., Jin R., Merikangas K.R., Walters E.E., 2005a. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Arch Gen Psychiatry.* 62(6), 593-602.
- Kessler R.C., Chiu W.T., Demler O., Merikangas K.R., Walters E.E., 2005b. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 62(6), 617-627.
- Kessler R.C., Petukhova M., Sampson N.A., Zaslavsky A.M., Wittchen H., 2012. Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *Int J Methods Psychiatr Res.* 21(3), 169-184.
- Kleinknecht R.A., Thorndike R.M., 1990. The Mutilation Questionnaire as a predictor of blood/injury fear and fainting. *Behav Res Ther.* 28(5), 429-437.
- Klorman R., Weerts T.C., Hastings J.E., Melamed B.G., Lang P.J., 1974. Psychometric description of some specific-fear questionnaires. *Behavior Therapy.* 5(3), 401-409.
- Manassis K., Bradley S., Goldberg S., Hood J., Swinson R.P., 1995. Behavioral-inhibition, attachment and anxiety in children in mothers with anxiety disorders. *Can J Psychiat.* 40(2), 87-92.
- McDonald S. D., & Calhoun P. S., 2010. The diagnostic accuracy of the PTSD checklist: A critical review. *Clin Psychol Rev.* 30(8), 976-987.



- Meyer T.J., Miller M.L., Metzger R.L., Borkovec T.D., 1990. Development and validation of the penn state worry questionnaire. *Behav Res Ther.* 28(6), 487-495.
- Molina S., Borkovec T.D., 1994. The Penn State Worry Questionnaire: Psychometric properties and associated characteristics. In: Graham D, Tallis F, editors. *Worrying: Perspectives on Theory, Assessment and Treatment*. John Wiley and Sons, New York.
- Mota N., Cox B.J., Enns M.W., Calhoun L., Sareen J., 2008. The relationship between mental disorders, quality of life, and pregnancy: Findings from a nationally representative sample. *J Affect Disord.* 109(3), 300-304.
- Newman M.G., Holmes M., Zuellig A.R., Kachin K.E., Behar E., 2006. The reliability and validity of the Panic Disorder Self-Report: A new diagnostic screening measure of panic disorder. *Psychol Assess.* 18(1), 49-61.
- Reck C., Struben K., Backenstrass M., Stefenelli U., Reinig K., Fuchs T., et al., 2008. Prevalence, onset and comorbidity of postpartum anxiety and depressive disorders. *Acta Psychiatr Scand.* 118(6), 459-468.
- Rodriguez B.F., Pagano M.E., Keller M.B., 2007. Psychometric characteristics of the Mobility Inventory in a longitudinal study of anxiety disorders: Replicating and exploring a three component solution. *J Anxiety Disord.* 21(5), 752-761.
- Ruscio AM, Stein DJ, Chiu WT, Kessler RC. The epidemiology of obsessive-compulsive disorder in the national comorbidity survey replication. *Mol Psychiatry* 2010 01;15(1):53-63.
- Russell E.J., Fawcett J.M., Mazmanian D., 2013. Risk of obsessive-compulsive disorder in pregnant and postpartum women: A meta-analysis. *J Clin Psychiatry.* 74(4), 377-385.
- Simpson W., Glazer M., Michalski N., Steiner M., & Frey B. N., 2014. Comparative efficacy of the generalized anxiety disorder 7-item scale and the Edinburgh Postnatal Depression Scale as

- screening tools for generalized anxiety disorder in pregnancy and the postpartum period. *Can J Psychiat.* 59(8), 434-440.
- Spitzer R.L., Kroenke K., Williams J.B., Löwe B., 2006. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med.* 166(10), 1092-1097.
- Sutter-dallay A.L., Giaconne-marcesche V., Glatigny-dallay E., Verdoux H., 2004. Women with anxiety disorders during pregnancy are at increased risk of intense postnatal depressive symptoms: a prospective survey of the MATQUID cohort. *Eur Psychiatry.* 19(8), 459-463
- Uguz F., 2010. Is pregnancy associated with mood and anxiety disorders? A cross-sectional study. *Gen Hosp Psychiatry.* 32(2), 213-215.
- Uguz F., Gezginc K., Zeytinci I.E., Karatayli S., Askin R., Guler O., et al., 2007. Course of obsessive-compulsive disorder during early postpartum period: A prospective analysis of 16 cases. *Compr Psychiatry.* 48(6), 558-561.
- Vorstenbosch V., Antony M.M., Koerner N., Boivin M.K., 2012. Assessing dog fear: Evaluating the psychometric properties of the Dog Phobia Questionnaire. *J Behav Ther Exp Psychiatry.* 43(2), 780-786.
- Walker E. A., Newman E., Dobie D. J., Ciechanowski P., & Katon W., 2002. Validation of the PTSD checklist in an HMO sample of women. *Gen Hosp Psychiat.* 24(6), 375-380.
- Weathers F. W., Litz, B. T., Herman, D. S., Huska J. A., & Keane T. M. (1993, October). *The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility*. Paper presented at the annual convention of the International Society for Traumatic Stress Studies, San Antonio, TX.
- Weeks J.W., Spokas M.E., Heimberg R.G., 2007. Psychometric evaluation of the Mini-Social Phobia Inventory (Mini-SPIN) in a treatment-seeking sample. *Depress Anxiety.* 24(6), 382-391.

- Wenzel A., Haugen E.N., Jackson L.C., Brendle J.R., 2005. Anxiety symptoms and disorders at eight weeks postpartum. *J Anxiety Disord.* 19(3), 295-311.
- Wilkins K.C., Lang A.J., Norman S.B., 2011. Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. *Depress Anxiety.* 28(7), 596-606.
- Wynter K., Rowe H., Fisher J., 2013. Common mental disorders in women and men in the first six months after the birth of their first infant: a community study in Victoria, Australia. *J Affect Disord.* 151(3), 980-985.
- Zambaldi C.F., Cantilino A., Montenegro A.C., Paes J.A., de Albuquerque T.L.C., Sougey E.B., 2009. Postpartum obsessive-compulsive disorder: prevalence and clinical characteristics. *Compr Psychiatry.* 50(6), 503-509.

Table 1: Period prevalence and incidence of perinatal mood and anxiety disorders in pregnancy, the first 3-months postpartum and the full perinatal period (i.e., from the beginning of pregnancy to 3-months postpartum).

N = 310	Prevalence		Incidence	
	95% CI	n	95% CI	n
ANXIETY DISORDERS				
Pregnancy	11.7 < <b>15.8</b> < 19.9	49	1.7 < <b>3.9</b> < 6.1	12
Postpartum	12.9 < <b>17.1</b> < 21.3	53	0.6 < <b>2.3</b> < 4.0	7
Perinatal	13.2 < <b>17.4</b> < 21.6	54	3.4 < <b>6.1</b> < 8.8	19
MAJOR DEPRESSION				

## Perinatal anxiety disorder

Pregnancy	1.7 < <b>3.9</b> < 6.1	12	1.2 < <b>3.2</b> < 5.2	10
Postpartum	2.4 < <b>4.8</b> < 7.2	15	0.8 < <b>2.6</b> < 4.4	8
Perinatal	3.8 < <b>6.5</b> < 9.2	20	3.2 < <b>5.8</b> < 8.4	18

Table 2: Period prevalence for individual anxiety disorders

	Pregnancy		Postpartum		Perinatal	
N = 310	95% CI	n	95% CI	n	95% CI	n
Specific phobia	4.5 < <b>7.4</b> < 10.3	23	4.5 < <b>7.4</b> < 10.3	23	4.7 < <b>7.7</b> < 10.7	24
Social anxiety disorder	2.4 < <b>4.8</b> < 7.2	15	2.7 < <b>5.2</b> < 7.7	16	2.7 < <b>5.2</b> < 7.7	16
Obsessive compulsive disorder	1.0 < <b>2.9</b> < 4.8	9	1.5 < <b>3.6</b> < 5.7	11	1.7 < <b>3.9</b> < 6.1	12
Generalized anxiety disorder	0.8 < <b>2.6</b> < 4.4	8	1.2 < <b>3.2</b> < 5.2	10	1.5 < <b>3.6</b> < 5.7	11
Panic disorder	0.2 < <b>1.6</b> < 3.0	5	0.2 < <b>1.6</b> < 3.0	5	0.2 < <b>1.6</b> < 3.0	5
Posttraumatic stress disorder	-0.2 < <b>0.7</b> < 1.6	2	-0.2 < <b>0.7</b> < 1.6	2	-0.2 < <b>0.7</b> < 1.6	2
Anxiety disorder NOS	-0.2 < <b>0.7</b> < 1.6	2	-0.2 < <b>0.7</b> < 1.6	2	-0.2 < <b>0.7</b> < 1.6	2
Agoraphobia	-0.3 < <b>0.3</b> < 0.9	1	-0.3 < <b>0.3</b> < 0.9	1	-0.3 < <b>0.3</b> < 0.9	1
Acute stress disorder	N/A	0	N/A	0	N/A	0

Table 3: Prevalence and incidence of perinatal anxiety disorders among primiparous and multiparous women.

	Primiparous		Multiparous	
	(n = 199)		(n = 96)	
	95% CI	n	95% CI	n

## PREVALENCE

Pregnancy	11.4 < <b>16.6</b> < 21.8	33	7.5 < <b>14.6</b> < 21.7	14
Postpartum	13.2 < <b>18.6</b> < 24.0	37	7.5 < <b>14.6</b> < 21.7	14

## INCIDENCE

Pregnancy	1.6 < <b>4.5</b> < 7.4	9	-0.8 < <b>2.1</b> < 5.0	2
Postpartum	0.6 < <b>3.0</b> < 5.4	6	-1.0 < <b>1.0</b> < 3.0	1

**Highlights**

- Anxiety and related disorders were found to affect more than 15% of pregnant and postpartum women.
- Anxiety and related disorders were found to be more common than is depression among pregnant and postpartum women.
- Our findings provide evidence of an increased risk of OCD among pregnant and postpartum women.

Figure 1 – STROBE diagram

